

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	Fang Lei
Application No. 10/764,908	Filing Date: January 26, 2004
Title of Application:	Image Transmission System From Three Rod Lenses For Rigid Endoscopes
Confirmation No. 3365	Art Unit: 2872

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Reply Brief Under 37 CFR §41.41

Dear Sir:

Having received the Examiner's Answer, Appellant submits this Reply Brief for the above-captioned application pursuant to 37 C.F.R. §41.41 as follows.

Reply to Examiner's Answer

As explained in the background of the present application, the prior art comprising image transmission assemblies employing rod lenses set the outer rod lenses at a distance from the center lens, which is substantially shorter than the outer lenses. Spec., Para. 0006-11. These arrangements facilitate good correction of astigmatism and image field curvature. Spec., Para. 0012. However, one problem with such arrangements is that the image transmitted to the proximal end of the endoscope is significantly darker than the original image at the distal end. *Id.* Accordingly, the present invention aims to produce a brighter image (without unacceptably poor astigmatism and image field curvature) by employing an assembly that uses rod lenses that are all of an optically homogeneous material and where all their optically active surfaces are spherical, and using a center lens equal to or longer than the outer lenses and positioning them vertex-to-vertex adjacent each other. Spec., Para. 0013-15.

Optically Homogeneous Material

Independent claim 1 recites that all lens elements consist of optically homogeneous material. The Examiner states that Takahashi '015 discloses this. The Examiner does not support this statement with a translation of this Japanese reference or by pointing to where it allegedly says this.

Takahashi does not disclose this claim element. In fact, claim 2 of Takahashi specifically recites that the difference in the refractive indices of the outer lenses is greater than 0.04.

Center Lens Essentially the Same Length or Longer than Outer Lenses

Takahashi '015, like the prior art cited in the present application, is specifically concerned with correcting field curvature and astigmatic aberration. Takahashi, Col. 2. Accordingly, Takahashi, like the prior art, employs center and outer rod lenses, where the center lens is significantly shorter than the outer lenses and the lenses are set a distance apart. Takahashi, Figs. 3-8.

The Examiner acknowledges that Takahashi '015 does not disclose employing a center lens that is essentially the same length as, or longer than, the outer rod lenses. However, the Examiner looks to a second reference, Takahashi '846, which discloses quite a few different lens assemblies, including a couple where the length of the center rod is about the same as, or longer than, the length of the outer rods. Cols. 44-55. The Examiner states that it would have been obvious to replace the center rod lens of Takahashi '015 with "a center rod lens element having its length essentially the same as the length of the outer rod lens element as suggested by Takahashi et al '846 for the purpose of enlargement [sic] the numerical aperture to allow a greater number of light rays pass [sic] through the image transmission unit and thus increase the brightness." Exam. Ans. at 7. The Examiner simply parrots the language of Appellant's own

specification, almost verbatim (Spec., Para. 0019), which is simply not appropriate. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 36 (1966) (warning against the “temptation to read into the prior art the teachings of the invention in issue”). The Examiner has provided no basis for *why* it would allegedly be obvious for one skilled in the art to do this, which is likewise improper. *In re Kahn*, 441 F.3d 977, 988 (C.A.Fed.2006) (“[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness”).

Appellant notes that it is not appropriate to simply piece together the claimed invention from different pieces of prior art, using the Applicant’s disclosure as a roadmap. *Princeton Biochemicals, Inc. v. Beckman Coulter, Inc.*, 411 F.3d 1332, 1337 (Fed. Cir. 2005). The United States Supreme Court has recently affirmed the importance of identifying a *reason why* one skilled in the art would have been motivated to combine the various elements to arrive at the claimed invention in order to guard against engaging such hindsight, explaining:

a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.

KSR Int’l Co. v. Teleflex, Inc., 127 S.Ct. 1727, 1741 (2007). Accordingly, when rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual

basis to support the conclusion of obviousness. See *In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1998). This requires making the factual determinations set forth in *Graham*. See KSR at 1729-30. The Examiner bears the initial burden of presenting a *prima facie* case of unpatentability. *In re Oetiker*, 977 F.2d 1443 (Fed. Cir. 1992).

Appellant respectfully submits that the Examiner has provided no factual basis or analysis, but instead, has simply copied Appellant's own recitation of the beneficial result of its invention in the present application. The Examiner has not explained why it would allegedly have been obvious to one skilled in art to enlarge the numerical aperture of the image transmission unit (thereby allowing the passage of more principal rays to create a brighter image) by making the center lens longer than the outer lenses in a series of rod lenses that are optically homogeneous material, have all spherical surfaces, and are positioned vertex-to-vertex. The Examiner simply says that it would be.

The Examiner does not even mention the level of skill in the art, much less why it would be obvious to one skilled in the art to combine these lens features and position them in this way. Indeed, the Examiner does not even take Official Notice of anything in this regard, which the Examiner cannot do. A longer lens does not equal a larger numerical aperture. The claimed invention is composed of a series of lens features that, in combination, produce an image transmission unit that produces a brighter image, yet does not result in unacceptably poor astigmatism and image field curvature. The Examiner has provided no reason why it would allegedly be obvious to one skilled

to start with a series of rod lenses made of an optically homogeneous material and have all spherical surfaces, and then position them vertex-to-vertex and make the center one about equal to or longer than the outer ones, in order to enlarge the numerical aperture and thereby increase brightness.

Moreover, it is particularly unclear why this would allegedly be obvious in light of the fact that, as explained above, Takahashi employs an assembly where the index of refraction changes and, unlike with lens length, the numerical aperture is necessarily directly dependent upon the index of refraction of the lens material. There is no reason why it would supposedly be obvious to make the center lens longer in an transmission unit like Takahashi '015, which has a changing index of refraction.

As noted in Appellant's principal brief, the Examiner, when challenged to provide such a reason during prosecution, simply asserted that the secondary reference (Takahashi '846) shows that a center rod lens "can" be the same length as the outer rod lenses, and on that basis, summarily concludes that one skilled in the art "will" modify the lens system of the primary reference (Takahashi '015). App. Br. at 5-6. In the Examiner's Answer, the Examiner simply responds by stating that both references "are clearly from a common field of endeavor" (Exam. Ans. at 12), and then repeats similar language—namely, that because a second reference (Takahashi '846) generally shows that a center rod "can be" longer than outer rod lenses, it would be obvious to one skilled in the art to modify an assembly like Takahashi '015 in this way (Exam. Ans. at

13). Appellant submits that this clearly does not establish even a *prima facie* case that it would have been obvious to combine all the elements as claimed.

Appellant respectfully submits that the Examiner has not established why it would allegedly be obvious to one skilled in art to combine the different elements as presently claimed. Instead, the Examiner has simply picked and chosen different pieces of different references in order to piece together the claimed invention—using the Applicant's disclosure as a roadmap—which is inappropriate. As the Court of Appeals for the Federal Circuit has explained:

[I]n making the assessment of differences between the prior art and the claimed subject matter, section 103 specifically requires consideration of the claimed invention "as a whole." Inventions typically are new combinations of existing principles or features... The "as a whole" instruction in title 35 prevents evaluation of the invention part by part. Without this important requirement, an obviousness assessment might successfully break an invention into its component parts, then find a prior art reference corresponding to each component. This line of reasoning would import hindsight into the obviousness determination by using the invention as a roadmap to find its prior art components.

Princeton Biochemicals, 411 F.3d at 1337 (Fed. Cir. 2005) (citations omitted) (emphasis added). See also *KSR*, 127 S.Ct. at 1742 ("A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon *ex post* reasoning.").

Vertex-to-Vertex Adjacent Lenses

Claim 1 also recites that the rod lenses are positioned vertex-to-vertex adjacent to one another. Takahashi '015 also does not disclose this element. However, the Examiner appears to suggest that "vertex-to-vertex adjacent" simply means that the rod lenses are oriented longitudinally in sequence. Exam. Ans. at 14. Appellant submits that this reading is not reasonable. The rod lenses obviously must be arranged longitudinally in sequence, which would essentially render the phrase "vertex-to-vertex adjacent" superfluous under the Examiner's construction, even though this position of the lenses is described as a key aspect of the present invention. Spec., ¶ 0015.

The term "vertex-to-vertex" is used in the present application much like the word "end-to-end" would be, but, in this instance, vertex-to-vertex is more accurate than end-to-end, since the ends of the lenses are curved. Appellant submits that this meaning of the term is made plain from the specification and drawings, including, for example, the abstract, which explains that "the rod lenses are arranged apex to apex next to one another". While Appellant recognizes that limitations cannot be incorporated into the claims from the specification (as noted by the Examiner), Appellant notes that claim terms must also be read in light of the specification, because virtually every word has multiple definitions and could therefore be construed in a manner not reasonably intended by its use in the claims at issue.

This is not a matter of incorporating a limitation from the specification, but rather, a proper assessment of what the phrase vertex-to-vertex adjacent means as used in this application. In this case, vertex-to-vertex adjacent is the most accurate way of describing

the positions of the rod lenses relative to each other—namely, that the tips of rod lenses are directly adjacent each other. Appellant submits that this clearly intended meaning of this term is even explicitly set forth in the specification, which parenthetically defines *directly* adjacent as vertex-to-vertex adjacent. Spec., Para. 0018 (stating that "...the rod lenses are directly (vertex-to-vertex) adjacent to one another..."). Appellant further submits that the Examiner's attempt to read this claim language on a lens assembly that specifically defines clear distances d_2 and d_6 between its rod lenses (Takahashi '015, Figs. 3-8 and accompanying value tables), while the present application specifically states that the fact that the lenses are "vertex-to-vertex adjacent" each other allows one to dispense with distancing tubes (Spec., Para. 0018), is unreasonable.

For the foregoing reasons, as well as those set forth in Applicant's previously filed Appeal Brief, Appellant respectfully submits that claims 1, 3, 5-9, 11-14 and 16-17 are patentable over the cited prior art. Accordingly, it is submitted that the rejection of claims 1, 3, 5-9, 11-14 and 16-17 should be reversed.

Respectfully submitted,

November 26, 2007

/Wesley W. Whitmyer, Jr./

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